The Ballarat Naturalist

October 2013

Rocks and Minerals

Brenda Beck – Science Tutor at the U3A, Ballarat

The Guest Speaker at our September meeting was Brenda Beck, who ran an excellent lecture on *Minerals,* including a hands-on workshop and demonstration of interesting specimens. If only our own geology teachers had been so lively, logical and entertaining! Brenda was born in Michigan where she developed a strong interest in rocks and minerals at an early age. At universities in Michigan, California and Arizona, Brenda studied music and later mathematics, geology and science. She has lived and worked as a teacher in Australia, Thailand, the USA and other countries for much of her life.

Brenda explained that “minerals” are elements or compounds (combinations of elements) with a definite chemical composition, whereas “rocks” are made up of different minerals of approximate compositions. Some minerals are elements, such as silicon (Si with atomic No 14) and sulphur (atomic No 16). Elements such as silicon, copper and iron are common in many different minerals. Most minerals are inorganic. One exception is calcite, (formula $CaCO_3$) found in organic limestones.

During the formation of the Earth, heavy metals such as iron and nickel, sank to form the central core, and the lighter silicates rose to become the earth’s outer crust. Silicate minerals comprise around 90% of that crust, and, in the universe silicates contain the 8th most common element, silicon. On earth, silicon occurs as silicon oxide (quartz, SiO_2) and other silicate minerals such as feldspar and mica.

As a guide for this geology session, we were given useful lists of: (1) Silicate minerals, (2) Non-silicate minerals and (3) Common metal elements and some of their ores. We were then encouraged to handle specimens of most of them, from Brenda’s collection from USA Thailand, Australia, and from other parts of the globe, and the John Souter collection .

Silicate minerals

Quartz is the most common silicate mineral and forms mainly in granite deep in the earth's crust. Around Ballarat, the most common form is Milky quartz. Quartz often has crystals of various sizes, which formed in fissures and gas pockets (geodes) in the magma. Amethyst has violet-coloured crystals, coloured by iron oxide.

Photo: Quartz crystals

Garnet forms in basalt or deep in the earth's crust. Gold is often associated with quartz and granite. Jade is a greenish/whitish, waxy and vitreous mineral. We were able to handle and inspect many of these minerals, including crystals of various sizes and types. Granite is made up of three silicate minerals; quartz, feldspar and mica. We were handed a "volcanic bomb", which showed the green mineral 'olivine' in its centre when broken open.

Other silicate minerals discussed were Chalcedony, Serpentine, Hornblende, Feldspar and Mica. Chalcedony is a fine grained silicate which includes various types: Agate – opaque with characteristic banding, Jasper - usually reddish (from iron oxide), Onyx – a tan-coloured agate, Flint (or Chert) found in chalk and limestone, and Opal which is iridescent in veins and crusts. Serpentine occurs in veins, and the fibrous form is asbestos. Hornblende is found in granite and marble. Feldspar minerals are classed in two groups - orthoclase and plagioclase. Mica is a silicate mineral with perfect cleavage – it is classed by colour, including Muscovite (silvery white) and Biotite (black, brown or dark green).

Non-silicate minerals

The first example of this group, was a piece of sulphur from a volanic fumarole. It is yellow and has a faint rotten-egg odour. Graphite was next, and we were able to draw on paper with flakes of this very soft form of metamorphosed carbon, (a pure form of coal , C - atomic No 6). A calcite crystal is an example of a non-silicate mineral. It is formed from limestone and occurs as various types of translucent to transparent crystals. Gypsum in its pure form is a clear, tabular crystal – transparent and very soft.

Common metals that are elements, and some of their ores

Photo: Cubic Galena crystals

As examples of this group, we discussed Stibnite (Antimony Sb 51) - a steel-grey, iridescent, soft and heavy mineral – used in galvanising. The next example was Copper (Cu 29) – in its pure or native forms; and Azurite with its blue colouration; Malachite with green colouration, and Chalcopyrite which is a bright gold, brassy colour but tarnishes to purple .The most pure iron mineral occurs As Magnetite (Fe 26) and is naturally magnetic. Iron pyrite (Fool's Gold) has cubic crystals, brassy and is often also confused with gold. Galena (Lead ore, Pb 82) is very heavy and has cubic crystals. Sphalerite (Zinc ore, Zn 30) is used in alloys. Silver (Ag 47) is malleable and flexible and used in making jewellery. Stanite (Tin ore, Sn 50) is dredged and smelted to mix with iron in making 'tin' cans etc. Gold (Au 79) is heavy, gold yellow, malleable and does not tarnish.

Examples of mineral formation and purification processes

Next in this interactive geology workshop, we were shown crystals of Halite (NaCl) or common salt, forming on the outer surface of a wooden spar and a piece of string dangling into a saturated salt solution. We were also able to simulate and observe the way Iron Ore (Taconite) is purified in the mining industry – by using a magnet to separate pure magnetite from a sample of crushed ore particles. In industry, the magnetite collected is 64% pure iron. It is then rolled into balls and fired to near melting point in a pelletizing furnace. This process produces a non-magnetic product for the steel industry that does not blow away during shipment.

We thank Brenda sincerely for her extremely informative and entertaining lecture, and for the huge amount of work she must have put into preparing her invaluable range of specimens and the useful handout. Thanks also to Carol Hall for arranging this talk from such an interesting fellow geologist.

Brenda Beck and John Petheram

Snippet from the Sept 1953 minutes

At the Juniors' meeting a boy brought along part of an human skull which he had found in the Murray district during his holidays.

Exc. -Sandon Forest & Rise and Shine Bushland Reserve

The eleven participants met up at Creswick and we travelled to Sandon Forest to begin our September club excursion. On a little side track off Main Track we spent over an hour seeing what was in flower. It was an orchid garden! There were about 10 species of orchids along with masses of leaves indicating that in a few weeks the area would be taken over by Chocolate Lilies and Blue Squill. There were a few fungi and lots of sundews. Gold Dust Wattle provided additional patches of colour.

Orchid list for the 2 sites

Cyrtostylis reniformis Small Gnat-orchid
Caladenia carnea Pink Fingers
Cyanicula caerulea Blue Fingers
Diuris pardina Leopard Orchid
Glossodia major Wax-lip Orchid
Pterostylis cyenocephala Swan Greenhood
Pterostylis nana Dwarf Greenhood
Pterostylis nutans Nodding Greenhood

We headed out of the forest along Main Track to the Captain's Gully-Sandon Road. Not many of the members had ventured this far into Sandon Forest before and as we travelled though several interesting vegetation types we pondered the prospect of future excursions.

After a brief stop at Newstead and, for some, a quick trip to the bakery, we headed off down the Daylesford Road. Before we left we observed Wood Ducks in the swimming pool enclosure, Blue Wrens on the roof of the hall, Red-browed Finch and Rosellas in the elms on a side street.

On the way to our next stop we noticed Gazanias growing en masse near the railway crossing at Clydesdale. Also noted, under the River Red Gums. were the bright yellow Oxalis - such is the fate of many roadsides these days as they become impacted by weeds. On a brighter side the blossom in an old orchard was looking lovely.

It was onto Ramsey Road and the Rise and Shine Bushland Reserve where we had lunch, making use of the shelter and seating provided. A jacky lizard was observed making a dash for cover which was a surprise. The local Newstead Landcare Group, Parks Victoria and others have put together an interesting self-guided walk through this site which “passes over the path of an ancient river, which flowed sometime between 5 and 35 million years ago”. Armed with additional guides we provided, we headed off for the 1.5 hour walk.

Photo: Morchella

The site had been used as a gravel quarry and it is interesting to see the vegetation gradually returning. There was plenty to see and even though it was early afternoon there were still quite a few birds about. A spider orchid was spotted by one group and there were patches of Pink Fingers and Blue Caladenias.

It is always hard to say how long an activity will take especially with Field Naturalists but good timing until some of the members wanted to see the morels that had been noticed by one member.

(The member was Elspeth -Ed.) Afternoon tea was put on hold for the few members who retraced their steps and found at least twenty morels.

A copy of the guided walk may be obained from:

http://geoffpark.wordpress.com/significant-places/rise-and-shine-bushland-reserve/ View some additional photos on our website

Elspeth Swan

John Gregurke's bird list for Rise and Shine Bushland Reserve

- Australian Magpie
- Australian Raven
- Australian Wood Duck
- Brown Treecreeper
- Buff-rumped Thornbill
- Common Bronzewing
- Crimson Rosella
- Dusky Woodswallow
- Eastern Rosella
- Eastern Yellow Robin
- Fuscous Honeyeater
- Galah
- Golden Whistler
- Grey Shrike-thrush
- Hoary-headed Grebe
- Masked Lapwing
- Musk Lorikeet
- Pacific Black Duck
- Red Wattlebird
- Striated Pardalote
- Welcome Swallow
- White-faced Heron
- White-winged Chough
- Yellow-tufted Honeyeater

Two Field Naturalist lectures

Stella Bedggood Memorial Lecture, November FNCB meeting

Where horticulture meets Ecology

by John Arnott, horticulturalist, RGB Cranbourne

Inaugural **Dick Southcombe Wider Geelong Flora lecture**, -in recognition of Dick's work in establishing the Wider Geelong Flora Lecture series with John Arnott.

'Foraging for freshwater red algae in Australia'

Presented by Professor Tim Entwisle, Dir & CE, RGB Melb, .

GBG Meeting Rooms, Tues. 8 Oct 7 pm cuppa, 7.30 start.

Excerpts from Club Meeting's Minutes Sept 6, 2013

Apologies: M Martin, S McLachlan, M Sorell, D & E Thurgood, M & J Cuttle, Genny Binns, Anna Baulch, John Morrish, Helen Burgess.

Correspondence. IN

Whirrakee August 2013

Acknowledgement from Dept. of Justice/Consumer Affairs of successful adoption of Model Rules

Email request from Mark Trinham re artwork inspirations for Delacombe wetlands – would like to know what significant flora & fauna might be there esp. water-based.

SWIFFT mentoring-meeting flyer and suggestion that someone from the club might like to go to a meeting in September. John Gregurke has already registered.

Letter from Friends of Canadian Corridor asking us to provide a letter supporting the creation of a Forest Park, and whether we would be interested in undertaking vegetation surveys.

OUT: Letter of support to Friends of Canadian Corridor.

Reply to Friends of CC re undertaking surveys. Could do Photo-point but not extensive long term veg. surveys due to lack of man-power.

Letter to DEPI commenting on proposed burns for 2014 .

General Business

Ideas for next year's syllabus needed.

The meeting agreed to send congratulations to Marilyn Hewish on her award of the Australian Natural History Medallion.

Show & Tell/Field Reports

5.9.13 Dulcie Brooke noticed Wood Ducks surveying the tall stump in her garden as a likely nesting site.

Jeanette Mitchell saw a Black Snake at Durham Lead.

6.9.13 In Claire Dalman's garden *Boronia megastigma* is flowering and New Holland Honeyeaters are enjoying the camellias.

25.8.13 John Gregurke in the Long Forest found Dwarf Greenhood *Pterostylis nana* and Pink Fingers *Caladenia carnea.*

6.9.13 Paul Norquay in the Long Forest saw Black-faced Cuckoo-shrikes, Brown Honeyeaters, Golden Whistler, Grey Fantails, Pink Finger Caladenias.

6.9.13 At Darley Elspeth Swan saw a good display of W.A. native plants with lots of NH Honeyeaters.

6.9.13 In central Ballarat Peter Billing noticed many blossom trees out, and Black Ducks on the Victoria Park lake.

30.8.13 Ken Hammond noted a Water Rat in the Nth Wetland Gardens. On 1.9.13 he saw 2 Caspian Terns on the south shore of Lake Burrumbeet.

1.9.13 Les Hanrahan at Bungaree observed a mob of 30 Black-faced Cuckoo-shrikes.

Carol Hall had heard that one of two Brolgas regularly roosting at Winter Swamp had been killed flying into lines along Blind Creek Road. It was sent to the Melbourne Museum. She has twice seen Water Rats in the Fairyland area of Lake Wendouree in the last month.

From the Lake to the Mountain.

Two artists, Ed Dunens & Martk Fox have an Exhibition at Art Gallery started Sept 14th for 4 weeks. Dunens' photography records Lake Wendouree - is wildlife, seasons and light. Fox presents paintings of rugged rural landscapes of the Victorian goldfields.

CALENDAR 2013

October

Fri 4	*Birds on my travels* - Ken Hammond, club member
Sun 6	*Brisbane Ranges* -Club members
11-14	SEANA Spring Camp, Numurkah
Tues 22	Committee meeting TBA

November

Fri 1	*Stella Bedggood Memorial Lecture (See notice p 6)*
*Sat 2	*Creswick Barby's Lane* - Jane Marriot, club member

Committee

President .... Peter Dalman
Vice –President..... Fran Hanrahan
Secretary .... Carol Hall
Treasurer............... Les Hanrahan

Elspeth Swan
Claire Dalman
John Gregurke
John Mildren
Val Hocking

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Meetings are held at the Primary Industries Training Centre, cnr Gillies and Gregory Sts, on the first Friday of the month at 7.30pm..
Excursions: Leave from the carpark at the Primary Industries Training Centre, cnr Gillies and Gregory Sts. at 9.30 am, unless otherwise advised.

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